

C-5.7 Apply the ideal gas law ( $pV = nRT$ ) to solve problems.

**Revised Taxonomy Level**    3.2 C<sub>A</sub>   Apply procedural knowledge

**Students did not address this concept in physical science**

**It is essential for students to**

- ❖ Explain the ideal gas law in terms of the Kinetic Molecular Theory
- ❖ Understand the ideal gas constant, R has various forms and must be consistent with the units for the other variables.

Unit of R	Numerical value of R	Unit of P	Unit of V	Unit of T	Unit of n
$\frac{L \cdot \text{mmHg}}{\text{mol} \cdot K}$	62.4	mm Hg	L	K	mol
$\frac{L \cdot \text{atm}}{\text{mol} \cdot K}$	0.0821	atm	L	K	mol
$\frac{J}{\text{mol} \cdot K}$	8.314*	Pa	m <sup>3</sup>	K	mol
$\frac{L \cdot \text{kPa}}{\text{mol} \cdot K}$	8.314	kPa	L	K	mol
*note: $1 L \cdot \text{atm} = 101.325 \text{ J}$ ; $1 \text{ J} = 1 \text{ Pa} \cdot \text{m}^3$					

- ❖ Use the ideal gas law equation to find pressure, volume, temperature, or number of moles.

### Assessment

The revised taxonomy verb for this indicator is implement (apply), the major focus of assessment will be for students to show that they can “apply a procedure to an unfamiliar task”. The knowledge dimension of the indicator, procedural knowledge means “knowledge of subject-specific techniques and methods” In this case the procedure for solving problems using the ideal gas law equation. A key part of the assessment will be for students to show that they can apply the knowledge to a new situation, not just repeat problems which are familiar. This requires that students have a conceptual understanding of the ideal gas law.